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CA

Flint clays from the Urals and products made from them. P. S. Man'yan and S. G. Grevyatskiy. *Ural Met.* 9, No. 2, 22-28 (1940). Chem. Zvesti, 1940, 11, 2670-1. The compn. and properties of different flint clays (I-V) and their behavior during firing were investigated. Flint clays I and II were high in  $Al_2O_3$  and low in Fe. Flint clays III and IV had practically the same chem. compn. but differed in appearance and texture; however, they could be used in mixts. All I types had fusion points above 1750°. Flint clay V had a high Fe content and a fusion point of 1680°. The best products made in the lab from mixts. contg. 70% flint clay were obtained from type I II, although III and IV gave satisfactory results. Type I required a different process. Factory tests confirmed these results. Products free from cracks could be obtained with type I only when 50% was used, or provided the raw materials were pre-fired which lowers the mech. strength and increases the porosity. Flint clay V was not usable. M. V. Condoide

ASS-SCA METALLURGICAL LITERATURE CLASSIFICATION

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

TRESVIATSKIY, S. G.

Cand. Tech. Sci;

Dissertation: "Method for Determination of Electrical Conductivity and its application for investigating Refractories at High Temperatures."

Moscow Order of Lenin Chemicotechnological Inst.

imeni D. I. Mendeleyev

3 Oct. 49

SO Vecheryaya Moskva  
Sum 71

BCS

*Research*  
*Refractories*

350. Methods for determining electrical conductivity and their application to the investigation of some refractories at high temperatures.—S. G. TASSVATSKY (Ogneupor., 16, 68, 1951). In mixtures of chromite and  $\text{Cr}_2\text{O}_3$ , changes occur in the structure of chromite grains at 1,400° C. The dark component of the grain diffuses to the periphery and there meets  $\text{Cr}_2\text{O}_3$  to form with it new crystalline formations cementing the changed chromite grains. This diffusing component is assumed to be Fe oxide which, under oxidizing conditions, forms a solid soln. with  $\text{Cr}_2\text{O}_3$ . In the absence of  $\text{Cr}_2\text{O}_3$  the current passes via chromite grains and through their points of contact. Small additions of  $\text{Cr}_2\text{O}_3$  cause the chromite grains to separate from each other, and new crystalline formations do not form a continuous phase. This causes the electrical resistance to increase. The addition of  $\text{Cr}_2\text{O}_3$  in large amounts has the opposite effect. With 50%  $\text{Cr}_2\text{O}_3$  present the new crystalline formations are so abundant that they form an unbroken phase, thus greatly reducing electrical resistance. Data are given on the conductivity of  $\text{Cr}_2\text{O}_3$  (which is almost 100 times as high as that of  $\text{MgO}$ ,  $\text{CaO}$  or  $\text{Al}_2\text{O}_3$ ) with and without additions and at different temps. It is stated that the further study of the electrical properties of refractories will provide information not only on their behaviour in electric furnaces but also on the body structure, its phase comp., etc. A study of the relationship between comp. and the electrical resistance of a refractory may make it possible in future to produce special refractories of given resistance. (10 figs., 3 tables.)

TRESVYATSKIY, S.G.

BUDNIKOV, P.P.; TRESVYATSKIY, S.G.

Fusibility diagram for the system  $MgO - CaF_2$ . Ukr.khim.zhur.  
19 no.5:552-555 '53. (MLRA 8:2)

1. Moskovskiy khimiko-tekhnologicheskii institut.  
(Systems (Chemistry)) (Magnesium oxide) (Fluorite) (Fusion)

**"APPROVED FOR RELEASE: 03/20/2001**

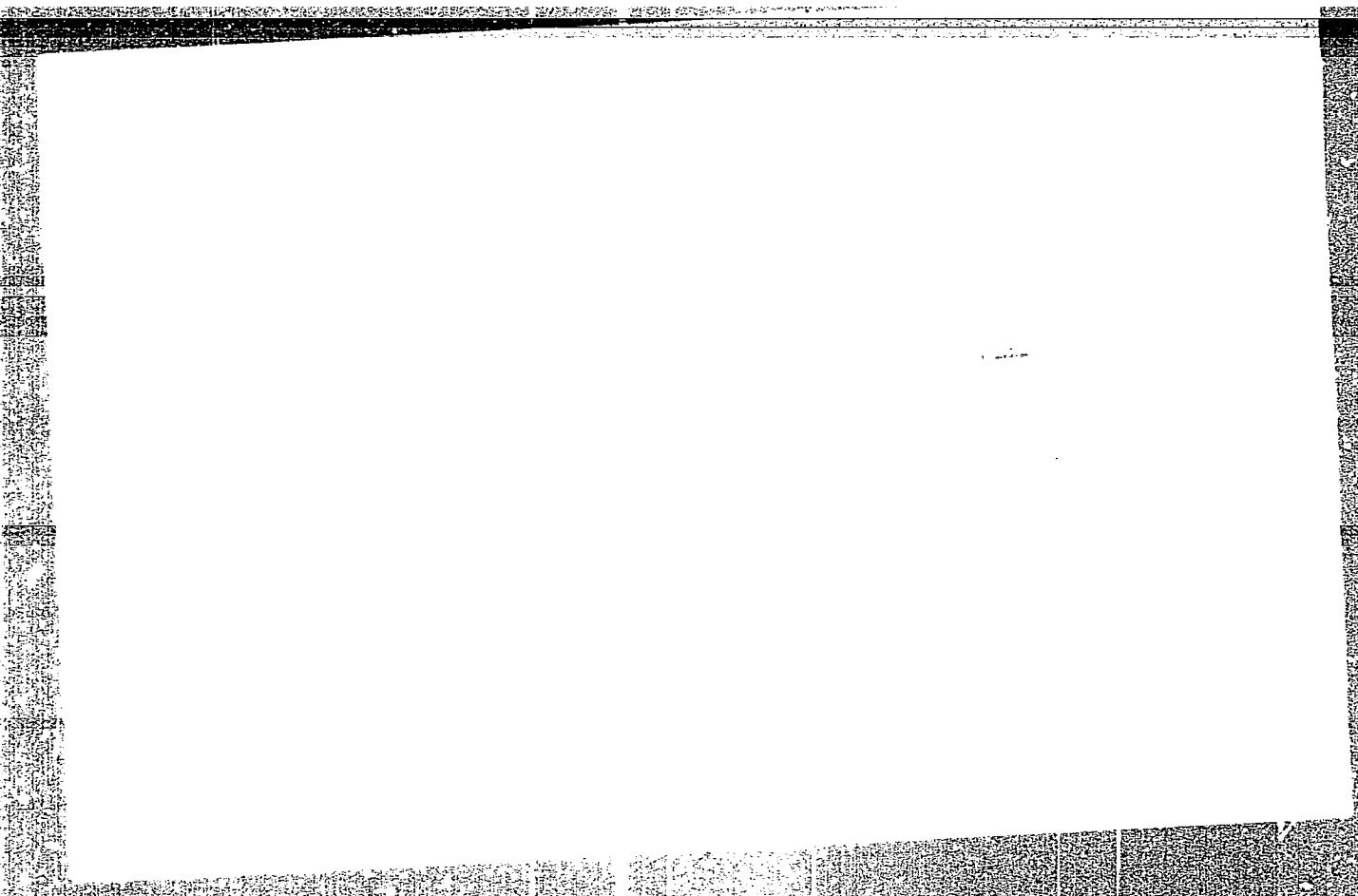
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**CIA-RDP86-00513R001756520020-3"**

BUDNIKOV, P.P.; TRESVYATS'KIY, S.G.

Diagram of the composition of  $\text{Na}_2\text{O}-\text{TiO}_2$  systems. Dop. AN URSS  
no.5:371-376 '54. (MLRA 8:7)

1. Diysniy chlen AN URSS (for Budnikov).  
(Sodium oxide) (Titanium oxides)

**"APPROVED FOR RELEASE: 03/20/2001**

**CIA-RDP86-00513R001756520020-3**

**APPROVED FOR RELEASE: 03/20/2001**

**CIA-RDP86-00513R001756520020-3"**



USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 25/56

Authors : Budnikov, P. P., Memb. Corres. of Ac. of Sc. USSR.; and Tresvyatskiy, S. G.

Title : Study of the structural diagram of  $\text{GeO}_2$  -  $\text{Li}_2\text{O}$

Periodical : Dok. AN SSSR 99/5, 761-763, Dec 11, 1954

Abstract : The presence in a  $\text{GeO}_2$  -  $\text{Li}_2\text{O}$  system of  $\text{Li}_2\text{GeO}_3$  and  $\text{Li}_4\text{GeO}_5$  compounds with melting points of  $1237^\circ$  and  $1295 \pm 3^\circ$ , respectively, was established by studying the structural diagram of the above mentioned system. The two eutectics discovered in the  $\text{GeO}_2$  -  $\text{Li}_2\text{O}$  system, their percentage composition and orientations, are described. A polymorphous conversion of  $\text{GeO}_2$  in compounds containing from 85 - 95 mol. % of  $\text{GeO}_2$  and 15 - 5 mol. % of  $\text{Li}_2\text{O}$ , was observed at a  $1035 \pm 3^\circ$  temperature. One German reference (1929-1931). Table; graph; illustrations.

Institution : The D. I. Mendeleev Chemical-Technological Institute, Moscow

Submitted : June 22, 1954

TRESVYATS'KIY, S.G.

BUDNIKOV, P.P.; TRESVYATS'KIY, S.G.

Electric conductivity of typical refractory clays subjected to high temperatures. Dop. AN URSR no.2:165-167 '55. (MLRA 8:11)

1. Diysniy chlen Akademii nauk URSR (for Budnikov) 2. Moskovs'kiy khimiko-tekhnologichniy institut imeni D.I.Mendeleyeva (Refractory materials--Electric properties)

TRESVYATSKIY, S. G.

2. Melting of fusible refractory oxides in an electric arc. The method is described in the patent of S. G. Tresvyatskiy, No. 151,100, 1961. The method is based on the use of a special electrode of the type described in the patent of S. G. Tresvyatskiy, No. 151,100, 1961. To increase the cond. of the fused globule, the assembly is placed in a tubular furnace placed at 5-10° angle to the horizontal electrodes so that the gases formed sweep upward, protecting the fused globule. Globules, sufficient for phase analyses, were thus prepd. from  $\text{Fe}_2\text{O}_3$ ,  $\text{NiO}$ ,  $\text{CoO}$ ,  $\text{Cr}_2\text{O}_3$ ,  $\text{CoCr}_2\text{O}_4$ ,  $\text{MgCr}_2\text{O}_4$ , etc. This method could not be applied to oxides of low elec. cond. at 700-800° ( $\text{Al}_2\text{O}_3$ ,  $\text{MgO}$ , etc.).

— L. Romagosa

TRESVYATSKIY, S.G.

5

✓ Electrical conductivity of corundum refractories at high temperatures. P. P. Budnikov and S. G. Tresvyatskiy (*Fireproof Mat., Moscow, 1955, 20, 70*).—This type of refractory often comes into contact with electric heating elements. A graph relates the logarithm of the specific electrical resistance of corundum refractories to the temp. and the content of bond clay. The highest resistance is shown by corundum specimens made without a bond ( $2.35 \times 10^6$  ohm/cm. at 700°). Those made with an addition of 2.5% clay have a resistance approx. one-tenth of this. As the clay content increases from 2.5% to 20%, the resistance decreases 2.5 times. With 20–50% clay, the resistance is largely independent of the composition, its value approaching that of specimens prepared from the same fireclay. BRIT CERAM. RES. ASS. ABSTR. (R.B.C.).

111

884

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TRESVYATS'KIY, S. G.

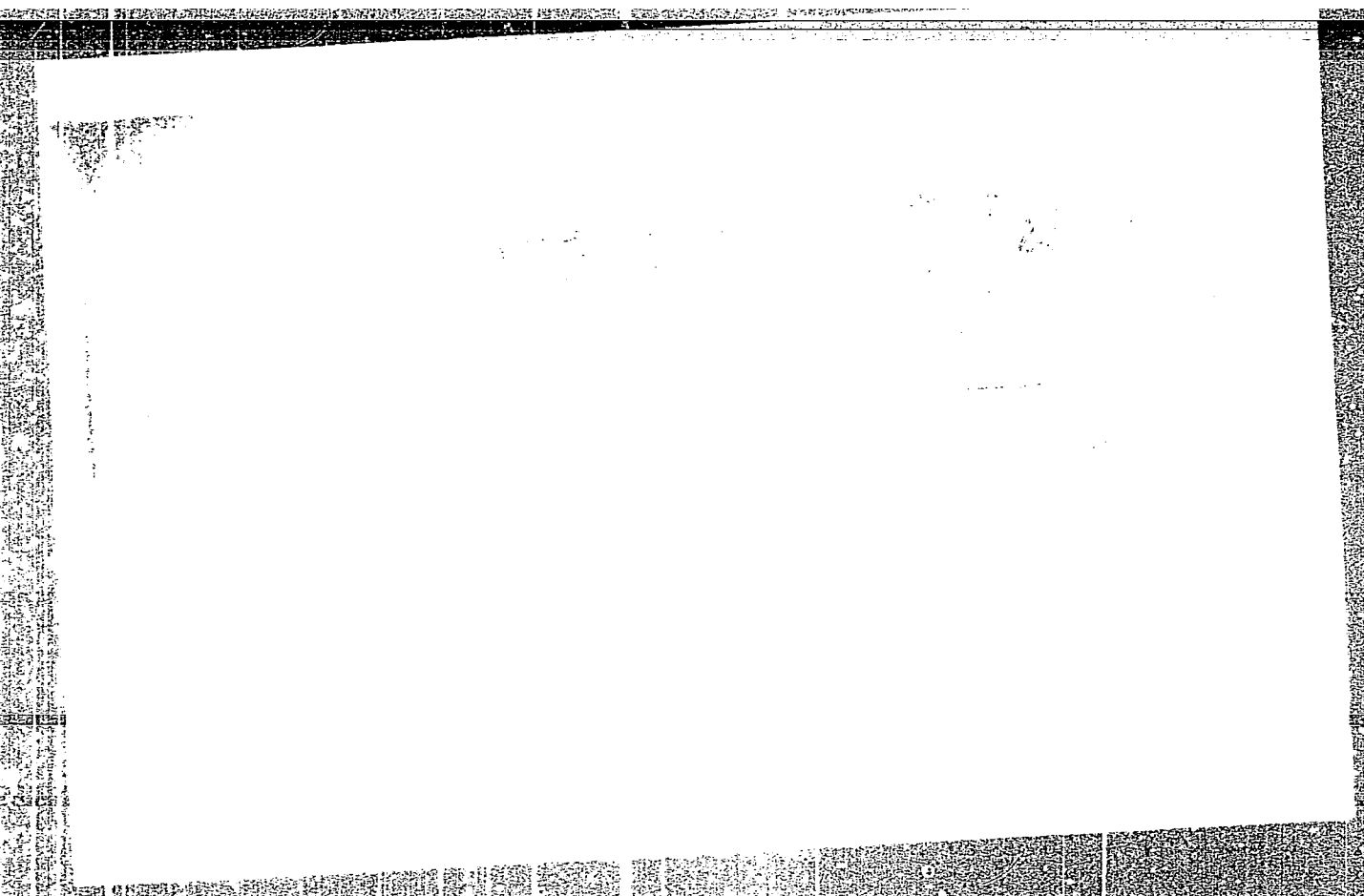
✓ Methods of high-temperature thermal analysis. P. P. Budnikov and S. G. Tresvyats'kiy. *Ogneupory* 20, 166-73 (1955).—Description of equipment and procedure for high-temp. thermal analysis (n.p.) up to 2200°. Temp. is measured with a W-Mo thermocouple. A Mo dish is suggested for melting and an electronic potentiometer for recording thermograms. B. Z. Kamich.

①

*Smirnov*

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instrument, which is shown with the

TRESVYATSKIY, S.G.

137-1958-1-177

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1, p 28 (USSR)

AUTHORS: Budnikov, P. P., Tresvyatskiy, S. G., Cherepanov, A. M.

TITLE: Highly Refractive Oxides and Their Products (Vysokoogneupornyye okisly i izdeliya iz nikh)

PERIODICAL: V sbornik Fiziko-khimicheskiye osnovy keramiki, Moscow, Promstroyizdat, 1956, pp 301-324

ABSTRACT: Current views on the processing of raw materials, charges, molding, and sintering, and the properties and areas of application of products made of highly refractive oxides melting at over 2000°:  $Al_2O_3$ , BeO, MgO, CaO,  $ZrO_2$ ,  $ThO_2$ , and  $CeO_2$ . In accordance with the data of Hume-Rothery (Hume-Rothery, W., Metallurgical Equilibrium Diagrams, London, 1952), practical recommendations are adduced on the choice of material for crucibles and the atmospheres and fluxes to be used in the fusion of 45 different pure metals (from light ones such as Li, Na, K and others to heavy ones like W, U, and others). Bibliography: 124 references.

S. G.

Card 1/1

1. Refractory oxides--Applications



131-1958-1-159

*TRESVYATSKIY, S.G.*

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 1, p 25 (USSR)

AUTHORS: Budnikov, P. P., Tresvyatskiy, S. G.

TITLE: A Method for Determining the Temperature of the Liquidus and the Solidus in Studies of Fusibility Diagrams and Phase Diagrams of Highly Refractory Oxides (Metodika opredeleniya temperatur likvidusa i solidusa pri izuchenii diagramm plavkosti i diagramm sostoyaniya vysokooagneupornykh okislov)

PERIODICAL: V sb.: Fiz.-khim. osnovy keramiki. Moscow, Promstroyizdat, 1956, pp 520-536

ABSTRACT: Literature data are employed to set forth methods of determining the temperatures of the liquidus in systems where smelting is done in air, in an inert gas atmosphere or in a vacuum, a method of annealing and hardening, and a method of thermal analysis at high temperatures with employment of high-temperature W-Mo thermocouples. The latter method, developed by the Authors, is described in greatest detail. Fusion and crystallization curves of  $Al_2O_3$ ,  $3 Al_2O_3$ ,  $2SiO_2$ ,  $Mg_2 SiO_4$ ,  $CaAl_2 O_4$ , and  $CaF_2$ , obtained by the W-Mo thermocouple method, are adduced. S. G.

Card 1/1

1. Refractory oxides--Temperature--Determination 2. Ores--Processing--Equipment

BUDNIKOV, P.P.; VOLODIN, P.L.; TRESVYATSKIY, S.G.

Review of data on the system:  $\text{CaCl}_2$  --  $\text{BaCl}_2$ . Ukr.khim.zhur.22  
no.3:292-294 '56. (MIRA 9:9)  
(Chlorides)

TRESVYATSKIY, S. G.

PHASE I BOOK EXPLOITATION

83

AUTHORS: Tresvyatskiy, S. G., and Cherepanov, A. M.

TITLE: High-refractory Materials and Oxide Products  
(Vysokoogneupornyye materialy i izdeliya iz okislov)

PUB. DATA: Gosudarstvennoye nauchno-tekhnicheskoye izdatel'stvo  
literatury po chernoy i tsvetnoy metallurgii, Moscow,  
1957, 246 pp., 3,000 copies

ORIG. AGENCY: None given

EDITORS: Matveyev, M. A.; Ed. in chief: Budnikov, P.P.,  
Academician; Ed. of the Publ. House: Rozentsveyg, Ya.D.;  
Tech. Ed.: Vaynshteyn, Ye. B.

PURPOSE: This book is for engineers and technicians working  
with refractory materials in the fields of metallurgy  
and industries using high temperatures.

COVERAGE: The book provides data on the manufacture and uses of  
high-refractory materials made from pure oxides and  
presents a method of classifying products made

Card 1/5

# High-refractory Materials and Oxide Products (Cont.)

83

from alumina, zirconia, spinellides, oxides of bivalent metals, actinides, lanthanides, and mixed oxides. The principal stages of the manufacturing process are reviewed.

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### Introduction

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### Ch. I. General Information on High-refractory Oxide Products

1. Classification of high-refractory oxide products 7
2. Principal stages of the technological process of manufacturing high-refractory oxide products 9
3. General survey of the properties of high-refractory oxide products 42
4. Use of high-refractory oxide products 61

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### Bibliography to Ch. I.

There are 111 references of which 55 are Soviet, 50 English, 4 German, 2 Japanese.

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High-refractory Materials and Oxide Products (Cont.) 83

Ch. II. High-refractory Materials from Alumina

1. Manufacture and properties of alumina 70
2. Techniques of manufacturing products from alumina. 86
3. Use of products from alumina 99

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Bibliography to Ch. II.

There 64 references of which 47 are Soviet, 13 English,  
4 German.

Ch. III. High-refractory Products from Oxides of Bivalent Metals

1. Products from beryllium oxide 105
2. Products from magnesium oxide 123
3. Products from calcium oxide 139

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Bibliography to Ch. III.

There are 106 references, of which 42 are Soviet, 49 English,  
13 German, 3 unidentified.

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High-refractory Materials and Oxide Products (Cont.) 83

Ch. IV. High-refractory Products from Zirconia

- 1. Products from zirconia 155
- 2. Products from zirconium 182

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Bibliography to Ch. IV.

There are 67 references of which 26 are Soviet, 33 English,  
6 German, 2 French.

Ch. V. High-refractory Products from Oxides of Actinides  
and Lanthanides

- 1. Products from oxides of actinides 191
- 2. Products from oxides of lanthanides 215

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Bibliography to Ch. V.

There are 45 references, of which 11 are Soviet, 30 English,  
4 German.

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High-refractory Materials and Oxide Products (Cont.) 83

Ch. VI. High-refractory Compounds From Spinellides and From Mixtures of Oxides

1. General characteristics of high-refractory spinellides 220
2. Products from magnesia spinel 225
3. Products from mixtures of oxides 227

Bibliography to Ch. VI. 233

There are 27 references, of which 6 are Soviet, 20 English, 1 German

Appendix I. Some properties of high-refractory oxides and oxide products 237

Appendix II. Thermodynamic and physical properties of oxides 240

AVAILABLE: Library of Congress (TN677.T67)

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**APPROVED FOR RELEASE: 03/20/2001**

**CIA-RDP86-00513R001756520020-3"**



TRESVIATSKIY, S.G. [Tresviats'kiy, S.H.]

Study of  $\text{GeO}_2$  -  $\text{Na}_2\text{O}$  state diagram [with summary in English].

(MIRA 11:5)

Dop. AN URSS no.3:295-298 '58.

1. Moskovskiy khimiko-tekhnologicheskii institut. Predstavleno akademikom AN URSS P.P. Budnikovym [P.P. Budnykovym].  
(Germanium oxide) (Sodium oxide)

131-23-5-9/16

AUTHOR: Tresvyatskiy, S. G.  
 TITLE: On the Influence of Vibrogrinding on the Sintering of Active Magnesium Oxide (O vliyaniy vibropomola na spekaniye aktivnoy okisi magniya)  
 PERIODICAL: Ogneupory, 1958, Vol. 23, Nr 5, pp. 229-233 (USSR)

ABSTRACT:

L. I. Trenin took part in the experiments. In previous experiments it became evident that active magnesium oxide can well be sintered, but is difficult to press in dry condition and also by means of plasticizers. The poor compressibility is explained by the particularities of the powder structure. In figure 1 the photomicrography of the powder structure, which was produced from magnesium oxide. The latter was obtained by means of burning basic magnesium-hydrocarbonate at a temperature of 1200° to 1300°. The material was burnt in powder-form and was not ground afterwards. In photomicrography it can clearly be recognized that the fine periclase crystals have a longish shape of 10-15  $\mu$ . A powder from such longish crystals poorly deposits in charging and pressing, which explains its low bulk weight and its poor compressibility. A dry grinding in ball mills proved impossible here as the material

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On the Influence of Vibrogrinding on the Sintering of Active Magnesium Oxide 131-23-5-9/16

sticks to the walls. But it became evident that this does not occur in vibromills. Furthermore the experiment for the purpose of explaining the influence of vibrogrinding on the sintering of active magnesium oxide as well as the processes occurring on this occasion are described. Basic magnesium-hydrocarbonate of the "Chistyy" type, corresponding to GOST 6419-52 was used as initial material. From figure 2 it can be seen that by vibrogrinding the bulk weight increases and the sintering improves. In figures 3 and 4 the micro-structure of magnesium oxide powder is shown after 30 or 60 minutes of vibrogrinding respectively. It can be ascertained that the longish form of the crystals disappeared and that they assumed a roundish shape. Then the sintering of samples of ground and unground powder was investigated. The samples were pressed dry under a pressure of 500 kg/cm<sup>2</sup> and burnt in a vacuum kiln. The results are illustrated in the table and figure 5. As can be seen from them the sintering of vibroground samples begins at a temperature of 1350° and is finished at 1600°. For unground samples the sintering begins at 1450° and is not finished even at 1800°. It seems to be practical, to ascertain the microstructure and the bulk weight of the powders before the processing, and also the volumetric weight of the unburnt samples, which should

Card 2/3

On the Influence of Vibrogrinding on the Sintering of Active Magnesium Oxide 131-23-5-9/16

not be less than 0,5 - 0,6 of the specific weight of the material. There are 5 figures, 1 table, and 7 references, all of which are Soviet.

AVAILABLE: Library of Congress

1. Magnesium oxide - Sintering
2. Vibration mills - Applications
3. Grinding - Effectiveness

Card 3/3

TR ESVYATSKiy, S G.

22(A)

MASS I BOOK REFERENCE

807/2714

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958

Dobrye sovetskikh uchenykh; yadernye goruyshche i reaktorovye ustroystva. (Reports of Soviet Scientists; Nuclear Fuel and Reactor Metals) Moscow, Atomizdat, 1959. 670 p. (Series: 112: Energy, vol. 1, 6,000 copies printed.

Ed. (title page): A.A. Rezhovskiy, Academician, A.P. Vinogradov, Academician, V.A. Izrael'yev, Corresponding Member, USSR Academy of Sciences, and A.P. Rezhovskiy, Corresponding Member, USSR Academy of Sciences. V.V. Pavlovskiy and G.M. Pchelintsev, Tech. Ed.: E.I. Masal'.

NOTE: This volume is intended for scientists, engineers, physicists, and biologists working in the production and peaceful application of atomic energy for professors and students of schools of higher technical education where the subject is taught, and for people interested in atomic science and technology.

CONTENTS: This is volume 3 of a 6-volume set of reports on atomic energy, presented by Soviet scientists at the 2nd International Conference on the Peaceful Uses of Atomic Energy, held in Geneva from September 1 to 13, 1958. Volume 3 consists of two parts. The first part, edited by A.I. Zubov, is devoted to geology, prospecting, concentration and processing of nuclear source materials, metallurgy, processing technology of nuclear fuels and on metallurgy, and neutron irradiation effects on metals. The titles of the individual papers in most cases correspond word for word with those in the official English language edition on the Conference proceedings. See 807/2081 for the titles of the other volumes of the set.

Rezhovskiy, A.A., and A.P. Vinogradov. Investigating the Reactions of Uranium Dioxide and Fluorine Dioxide Chlorination by Carbon Tetrachloride (Report No. 2197)

285

Yakovlev, M.M., Ya.A. Yegorovskiy, and A.A. Dmitriyev. Phase Diagrams for the  $UO_2$  -  $ZrO_2$  and the  $UO_2$  -  $ZrO_2$  Systems (Report No. 2490)

315

Rezhovskiy, A.A., G.M. Pchelintsev, and V.I. Rukhovich. Binary Phase Diagrams for  $UO_2$  -  $Al_2O_3$ ;  $UO_2$  -  $SiO_2$ ; and  $UO_2$  -  $H_2O$  (Report No. 2193)

322

Rezhovskiy, A.A., V.A. Izrael'yev, Z.P. Filizovskiy, A.M. Korotkiy, and L.I. Golubovskiy. The Influence of Fluorination Methods on the Structure and Properties of Uranium (Report No. 2507)

333

Rezhovskiy, A.A., and Z.A. Rezhovskiy. Phase Diagrams of Gaseous Ternary Systems of Uranium and Chlorine (Report No. 2043)

347

Card 6/11

5(2)

AUTHORS:

Budnikov, P. P., Corresponding Member AS USSR, SOV/20-128-1-22/58  
~~Tresvyatskiy, S. G.,~~ Kushakovskiy, V. I.

TITLE:

Investigation of Phase Transformation of Uranium Oxides in Air

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 1, pp 85-88  
 (USSR)

ABSTRACT:

In the present paper the decomposition of uranoso-uranic oxide occurring with heating was investigated, as there are only contradictory data on this problem (Refs 1-6). The decay temperature was determined by means of continuous weighing of uranoso-uranic oxide in tabloid form or pulverized during heating within the temperature range of room temperature up to 1600-1900°. The curves of change in weight of uranoso-uranic oxide on heating and cooling in air are given in figures 1 and 2. For the determination of phase composition at different temperatures hardened samples were used. The results of investigation are given in table 1. The results of two series of investigation indicated that uranoso-uranic oxide loses oxygen to a large extent already at 900°. However, up to 1450° the quantity of oxygen still corresponds to the formula  $UO_{2.63}$ . The radiogram taken of the oxide of this

Card 1/2

Investigation of Phase Transformation of Uranium  
Oxides in Air

SOV/20-128-1-22/58

composition differs from the radiogram of  $U_3O_8$ . At still higher temperatures, up to the boiling point,  $U_4O_9$  at atmospheric pressure is in equilibrium with oxygen. The oxygen content within this oxide decreases with temperature increase. This causes a lengthening of the lattice spacing (Fig 3). The results found made it possible to complement the high-temperature range for the phase diagram of the U-O system (Fig 4), plotted by Akkermann (Ref 2). The samples  $UO_{2.093}$ ,  $UO_{2.14}$ , and  $UO_{2.08}$  calcined within the vacuum ( $10^{-1}$  torr) at 1050, 1100, and 1600° proved to be two-phase and consisted of  $UO_2$  and  $U_4O_9$ . However, it is possible that the two phases found by the authors during the decomposition of the solid solution have been formed due to too slow cooling. There are 4 figures, 1 table, and 6 references.

SUBMITTED: June 2, 1959

Card 2/2

84699

S/131/60/000/010/002/002  
B021/B058

15.2142

AUTHOR: Tresvyatskiy, S. G.

TITLE: The Influence of the Structural Type of the Crystal Lattice  
of Highly Refractory Oxides on the Relative Sintering  
Temperature

PERIODICAL: Ogneupory, 1960, No. 10, pp. 467 - 470

TEXT: The results of experiments on chemically pure aluminum,  
beryllium, and magnesium oxides are mentioned in the present paper. The  
relative sintering temperature was assumed to be equal to the firing  
temperature in °K. The dependence of the relative porosity on the rela-  
tive firing temperature in °K is shown in Table 1 and on the relative  
sintering temperature, in Fig. 1. The values of the microhardness of the  
oxides investigated were determined by means of the ПМТ-3 (PMT-3)  
instrument. The dependence of the relative sintering temperature and the  
microhardness of highly refractory oxides on the type and energy of the  
crystal lattice is shown in Table 2. The dependence of the relative  
sintering temperature on the energy of the lattice of highly refractory

Card 1/2



84699

The Influence of the Structural Type of the S/131/60/000/010/002/002  
Crystal Lattice of Highly Refractory Oxides on B021/B058  
the Relative Sintering Temperature

oxides, related to the unit volume ( $U_v$ , kcal/cm<sup>3</sup>) is shown in Fig. 2, and the dependence of the microhardness on the same quantity, in Fig. 3. The foregoing refers to the sintering of pure, highly refractory oxides of the solid phase and cannot entirely be extended to sintering processes in the presence of liquid phases, nor to the sintering of oxides of non-stoichiometric composition (such as Cr<sub>2</sub>O<sub>3</sub>, CeO<sub>2</sub>), or to the sintering of oxides with polymorphous transformations (ZrO<sub>2</sub>). There are 3 figures, 2 tables, and 7 references: 5 Soviet and 2 German.

Card 2/2

5.4110,21.1330

77219  
SOV/89-8-1-13/29

AUTHORS: Tresvyatskiy, S. G., Kushakovskiy, V. I.

TITLE: Melting Point Determinations in Air of Binary Mixtures of Uranium Oxides With Some Other Oxides. Letter to the Editor

PERIODICAL: Atomnaya energiya, 1960, Vol 8, Nr 1, pp 56-58 (USSR)

ABSTRACT: An increased interest in interactions of uranium oxide with other oxides in air prompted this investigation. The authors used  $\text{UO}_2$ ,  $\text{BeO}$ ,  $\text{MgO}$ ,  $\text{CaCO}_3$ ,  $\text{BaCO}_3$ ,  $\text{Al}_2\text{O}_3$ ,  $\text{La}_2\text{O}_3$ ,  $\text{SiO}_2$ ,  $\text{TiO}_2$ ,  $\text{ZrO}_2$ ,  $\text{ThO}_2$ ,  $\text{CeO}_2$ ,  $\text{H}_3\text{PO}_4$ ,  $\text{V}_2\text{O}_5$ ,  $\text{Ta}_2\text{O}_5$ ,  $\text{Bi}_2\text{O}_3$ ,  $\text{Cr}_2\text{O}_3$ ,  $(\text{NH}_4)_2\text{MoO}_4$ ,  $\text{H}_2\text{WO}_4$ ,  $\text{Fe}_2\text{O}_3$ , and  $\text{MnCO}_3$ , most of them classified as pure, analytically pure, and chemically pure. The degree of purity of  $\text{Ta}_2\text{O}_5$  and  $\text{V}_2\text{O}_5$  was not certain. Equimolar ratio was taken, except in case of oxides of Mg, Ca, Sr, and Ba where additional 1:2 and 2:1 molar ratio mixtures were prepared. The mixtures were first heated in porcelain

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Melting Point Determinations in Air of  
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containers at  $800^{\circ}\text{C}$ , and formed into briquets 25 mm in diameter, and then roasted at  $800-900^{\circ}\text{C}$ . The briquets were afterwards pulverized and the procedure repeated at  $1,000-1,100^{\circ}\text{C}$  and  $1,200-1,300^{\circ}\text{C}$  in platinum containers. At  $1,300^{\circ}\text{C}$  the procedure was repeated until the briquets looked stable, showed no cracks, and did not shrink. Determination of the melting temperature of mixtures. Except for mixtures which melted during preliminary roasting, the melting temperature was determined by method of cone deformation. The cone vertex was heated in electrical arc maintained between carbon electrodes. Temperature measurements were taken with a microoptical pyrometer with an accuracy of  $\pm 30-50^{\circ}\text{C}$  for specimens forming a droplet, and  $\pm 50-100^{\circ}\text{C}$  for those melting along the surface with a hard to obtain droplet. Results are listed in Table A. There is 1 table, and 1 Soviet reference.

SUBMITTED:

August 3, 1959

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Melting Point Determinations in Air of  
Binary Mixtures of Uranium Oxides With  
Some Other Oxides. Letter to the Editor

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Melting temperatures in air of binary mixtures of  
uranium oxides with other oxides

| Composition, mol % |             |                                     | Melting temperature in °C | Melting mode                              |
|--------------------|-------------|-------------------------------------|---------------------------|---|
| change             |             | U/He ratio from chemical analysis # |                           |   |
| UO <sub>2</sub>    | Other oxide |                                     |                           |   |
| 50                 | 50 BeO      | 1/1,5                               | 2200± 50                  | Melts with difficulty, almost no droplets |
| 67                 | 33 MgO      | 1/0,56                              | 1900± 50                  | Droplets form with difficulty             |
| 50                 | 50 MgO      | 1/1,12                              | 1750± 50                  | Melts with droplet formation              |
| 33                 | 67 MgO      | 1/1,53                              | 1850± 30                  | Same                                      |
| 70                 | 30 CaO      | 1/0,404                             | 2000± 50                  | * *                                       |
| 50                 | 50 CaO      | 1/1                                 | 2000± 50                  | * *                                       |
| 30                 | 70 CaO      | 1/2,35                              | 2200± 100                 | No droplets, surface melting              |
| 67                 | 33 SrO      | 1/0,4                               | 2000± 50                  | Same                                      |
| 50                 | 50 SrO      | 1/0,93                              | 2100± 50                  | * *                                       |
| 33                 | 67 SrO      | 1/2,37                              | 2200± 50                  | Melts with droplet formation              |

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Melting Point Determinations in Air of  
Binary Mixtures of Uranium Oxides With  
Some Other Oxides. Letter to the Editor

| Composition, mol % |                                   |  | Melting<br>temperature<br>in<br>°C | Melting mode   |
|--------------------|-----------------------------------|--|------------------------------------|--|
| change             |                                   | U/He ratio<br>from<br>chemical<br>analysis # |                                    |  |
| UO <sub>2</sub>    | Other<br>oxide                    |  |                                    |  |
| 67                 | 33 BaO                            | 1/0.54                                       | 1700 ± 30                          | Same   |
| 50                 | 50 BaO                            | 1/1.03                                       | 1700 ± 50                          | " "  |
| 33                 | 67 BaO                            | 1/1.9  | 1680 ± 50                          | Droplets were formed but not as<br>easily as in the previous mixture |
|                    |                                   |  | 1940 ± 30                          | Melts with droplet formation   |
| 50                 | 50 Al <sub>2</sub> O <sub>3</sub> | —  | 2350 ± 10                          | Droplets form with difficulty  |
| 50                 | 50 La <sub>2</sub> O <sub>3</sub> | 1/1.6  | 1770 ± 30                          | Surface melting  |
| 50                 | 50 SiO <sub>2</sub>               | 1/1  | 1480 ± 30                          | Melts easily   |
| 50                 | 50 TiO <sub>2</sub>               | —  | 2000 ± 50                          | Melts with difficulty, almost no droplets                            |
| 50                 | 50 ZrO <sub>2</sub>               | —  | He n.m.b.m.t.c.h                   | —  |
| 50                 | 50 ThO <sub>2</sub>               | —  | 2700 ± 150                         | Almost does not melt; welds to the<br>electrodes                     |
| 50                 | 50 CeO <sub>2</sub>               | —  | 1200 ± 1350                        | Sample melted during preliminary<br>roasting                         |
| 50                 | 50 P <sub>2</sub> O <sub>5</sub>  | —  |                                    |  |

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\* See note Card 5/5

Melting Point Determinations in Air of  
Binary Mixtures of Uranium Oxides With  
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| Composition, mol % |                                   |  | Melting<br>temperature<br>in<br>°C | Melting mode   |
|--------------------|-----------------------------------|--|------------------------------------|--|
| Change             |                                   | U/He ratio<br>from<br>chemical<br>analysis # |                                    |  |
| UO <sub>2</sub>    | Other<br>oxide                    |  |                                    |  |
| 50                 | 50 V <sub>2</sub> O <sub>5</sub>  | —  | <800                               | Same   |
| 50                 | 50 MoO <sub>3</sub>               | —  | 900—1000                           | " "  |
| 50                 | 50 WO <sub>3</sub>                | —  | 1100—1200                          | " "  |
| 50                 | 50 Ta <sub>2</sub> O <sub>5</sub> | —  | 1850 ± 30                          | Melts easily   |
| 50                 | 50 Bi <sub>2</sub> O <sub>3</sub> | —  | 1800 ± 50                          | Melts little, evaporates strongly<br>during heating      |
| 50                 | 50 PbO <sub>2</sub>               | —  | 1850 ± 50                          | Same   |
| 50                 | 50 SnO <sub>2</sub>               | —  | —                                  | Does not melt in the arc, strong<br>evaporation observed |
| 50                 | 50 Cr <sub>2</sub> O <sub>3</sub> | —  | 2050 ± 100                         | Droplets form with difficulty                            |
| 50                 | 50 Fe <sub>2</sub> O <sub>3</sub> | —  | 1370 ± 30                          | Melts easily   |
| 50                 | 50 MnO <sub>2</sub>               | —  | 1650 ± 30                          | " "  |
| 100                | Her                               | —  | 2700—2750 ± 100                    | Difficult to melt  |

\* In cases where chemical analysis was not performed,  
changes in chemical constitution were practically  
negligible, with the exception of mixtures with  
oxides of bismuth, lead and tin.

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82285

S/089/60/009/01/09/011  
B014/B070

18.12.15

AUTHORS:

Tresvyatskiy, S. G., Kushakovskiy, V. I., Belevantsev,  
V. S.

TITLE:

Investigation of the Systems  $\text{BeO} - \text{Sm}_2\text{O}_3$  and  $\text{BeO} - \text{Gd}_2\text{O}_3$

PERIODICAL:

Atomnaya energiya, 1960, Vol. 9, No. 1, pp. 54-55

TEXT: The starting materials for the preparation of the sample had a purity of 99.5 to 99.9 %. The temperatures of still liquid and already solidified melts contained in a molybdenum crucible were measured by means of a tungsten-molybdenum thermocouple. By a chemical analysis of the slowly crystallizing alloy, the composition of the eutectic was determined. The analysis shows that the composition of the alloys is not different from that of the layers. Microstructural analyses of molten samples indicate that in the hypoeutectic alloys beryllium oxide crystallizes first while in the hypereutectic alloys samarium and gadolinium oxides do so first. If the lattice constants of beryllium in thermally treated alloys containing oxides of rare earths are measured,

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82285

Investigation of the Systems BeO - Sm<sub>2</sub>O<sub>3</sub>  
and BeO - Gd<sub>2</sub>O<sub>3</sub>

S/089/60/009/01/09/011  
B014/B070

no solid solutions are found in beryllium oxide. The eutectics contain 35 mole % of samarium or gadolinium oxide and 65 mole % of beryllium oxide. The phase composition of the samples that contained much Sm<sub>2</sub>O<sub>3</sub> and Gd<sub>2</sub>O<sub>3</sub> could not be determined roentgenographically. Samples that contained 0.5 or more mole % of beryllium oxide and were annealed between 1300°C and 1500°C showed two distinct phases in reflected light. This supports the theory that in the systems BeO - Sm<sub>2</sub>O<sub>3</sub> and BeO - Gd<sub>2</sub>O<sub>3</sub> in the temperature range 1300-1500°C solid solutions do not occur in the oxides of rare earths. The phase diagrams of the above systems are reproduced in Figs. 1-3. The melting points of the eutectics of these systems are lower than those of the system BeO - La<sub>2</sub>O<sub>3</sub>. There are 3 figures and 3 references: 2 Soviet and 1 German.

SUBMITTED: January 7, 1960

Card 2/2



82957  
S/089/60/009/003/009/014  
B006/B063

54110  
AUTHORS: Tresvyatskiy, S. G., Kushakovskiy, V. I., Belevantsev,  
V. S.

TITLE: Investigation of the  $Al_2O_3$  -  $Sm_2O_3$  and  $Al_2O_3$  -  $Gd_2O_3$  Systems

PERIODICAL: Atomnaya energiya, 1960, Vol. 9, No. 3, pp. 219-220

TEXT: In the introduction to the present "Letter to the Editor", the writers discuss the results of other authors who have studied the systems mentioned in the title. The main part deals with experimental determinations of the solidus and liquidus temperatures of these systems between 1700° and 2350° C. For this purpose, the authors used the high-temperature thermal analysis according to the method described in Refs. 4 and 5.  $Sm_2O_3$  and  $Gd_2O_3$  with not more than 0.5% impurities (other oxides of rare earths), and  $Al_2O_3$  of the type ЧДА(ChDA) served as starting materials. The thermal analysis indicated the following: The eutectic ( $Al_2O_3$ - $Sm_2O_3$ )

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S/089/60/009/003/009/014  
B006/B063

Investigation of the  $\text{Al}_2\text{O}_3$  -  $\text{Sm}_2\text{O}_3$  and  
 $\text{Al}_2\text{O}_3$  -  $\text{Gd}_2\text{O}_3$  Systems

melts from the side of  $\text{Al}_2\text{O}_3$  at  $1770 \pm 20^\circ\text{C}$  (Fig. 1), while that of the  $\text{Al}_2\text{O}_3$  -  $\text{Gd}_2\text{O}_3$  system starts melting at  $1760 \pm 20^\circ\text{C}$  (Fig. 2). From the side of the rare-earth oxides, the eutectics reach their melting points at  $1860 \pm 20^\circ\text{C}$  and  $1930 \pm 20^\circ\text{C}$ , respectively. The compounds  $\text{SmAlO}_3$  and  $\text{GdAlO}_3$  melt practically at the same temperature, namely,  $2060 \pm 20^\circ\text{C}$ . A microstructural analysis after the thermal analysis (in reflected light) showed that in alloys having 0 - 20 mole% of rare-earth oxides  $\text{Al}_2\text{O}_3$  crystallized first; at 25 - 70 mole%  $\text{SmAlO}_3$  or  $\text{GdAlO}_3$ ; and at 75 - 100 mole%  $\text{Sm}_2\text{O}_3$  or  $\text{Gd}_2\text{O}_3$ . Eutectics were found between 20 and 25 mole% (low-melting eutectic) and between 70 and 75 mole% of rare-earth oxides (high-melting eutectic). Samples containing more than 1 or less than 99 mole% of such oxides were found to be two-phase substances. The invariant points of the two systems investigated (above  $1700^\circ\text{C}$ ) are listed in a table and compared with the data published in Ref. 3. The

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Investigation of the  $\text{Al}_2\text{O}_3$  -  $\text{Sm}_2\text{O}_3$  and  
 $\text{Al}_2\text{O}_3$  -  $\text{Gd}_2\text{O}_3$  Systems

S/089/60/009/003/009/014  
B006/B063

numbering of the points corresponds to that of Figs. 1 and 2. The results obtained by the authors partly agree with those of Ref. 3. There are 2 figures, 1 table, and 5 references: 2 Soviet, 2 US, and 1 British.

SUBMITTED: March 24, 1960

4

Card 3/3

BUDNIKOV, P.P.; VOLODIN, P.L.; TRESVYATSKIY, S.G.

Investigating the clinkering and recrystallization of pure magnesium  
oxide. Ogneupory 25 no.2:70-73 '60. (MIRA 13:10)  
(Magnesium oxide) (Crystallization) (Clinker brick)

15(2)  
AUTHOR:

Tresvyatskiy, S. G.

S/131/60/000/03/006/013  
B015/B005

TITLE:

On the Role of Closed Porosity in the Sintering of Pure,  
Highly Refractory Oxides <sup>15</sup>

PERIODICAL:

Ogneuroy, 1960, <sup>25</sup> Nr 3, pp 130-132 (USSR)

ABSTRACT:

To investigate the reasons for the anomalous behavior of magnesium oxide in sintering, the author describes the sintering conditions of active magnesium-, beryllium-, and aluminum oxide under similar conditions. The investigation results are graphically represented in figures 1, 2, and 3 which show the dependence of real, open, and closed porosity on the weight by volume of the samples. The fine structure of the magnesium-oxide sample is shown in figure 4. In conclusion, the author states that the sintering of samples up to a high density can only take place in the absence of closed pores. If the closed pores are mainly situated along the crystal boundaries, this process occurs at a sufficiently high rate, which is not the case with the formation of pores inside the crystals as can be observed in the sintering of active magnesium oxide. There

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On the Role of Closed Porosity in the Sintering of  
Pure, Highly Refractory Oxides

S/131/60/000/03/008/013  
B015/B005

are 4 figures and 3 Soviet references.



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TRESVIATSKIY, S.G., KUSHAKOVSKIY, V.I., BELLEVANTSEV, V.S.

High-temperature thermal analysis using tungstic molybdenum  
thermocouples. Ogneupory 25 no.4;180-181 '60. (MIRA 13:8)  
(Thermocouples)

TRESVIATSKIY, S.G.

Determining sintering temperatures of highly refractory masses.  
Ogneupory 25 no.5:232-233 '60. (MIRA 14:5)  
(Sintering)



TRESVIATSKIY, S.G.; GRIKOV, V.V.; VOLODIN, P.L.; SEROV, K.M.

High-temperature vacuum kilns for calcinating high-strength  
refractories. Ogneupory 25 no.7:313-316 '60. (MIRA 13:8)  
(Refractory materials) (Kilns)

TRESVIATSKIY, S.G.

Effect of the structure of the crystal lattice of highly refractory  
oxides on the relative temperature of clinkering. Ogneupory 25 no.10:  
467-470 '60. (MIRA 13:10)

(Refractory materials)

25250 G/005/61/000/000/001/003  
D029/D109

15.2630

AUTHORS: Budnikov, P.P., and Tresvyatskiy, S.G.

TITLE: Methods of high-temperature thermo-analysis of oxide systems

PERIODICAL: Silikattechnik, no. 9, 1961, 396-398.

TEXT: Static procedures such as the quenching method according to Belyankin, D.S., Lapin, V.V., and Toropov, N.A. (Ref. 1: The physical-chemical systems of silicate technology, 2nd revised edition, Moscow, Promstroisdat. 1954) or the cone fall point method have found wide application for the investigation of phase diagrams of highly fire-resistant oxides. The fall point method is easily applicable although the diagrams obtained must be considered fusibility diagrams under given test conditions rather than phase diagrams of the systems examined, according to Belyankin, D.S., Lapin, V.V., and Toropov, N.A. (Ref. 1.). The quenching method allows reliable results only if the test material forms glass on rapid cooling. If, however, the material has a high crystallization velocity and does not form glass on quenching, results according to the quenching method are not always reliable. The authors describe a

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Methods of high-temperature ...

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D029/D109

high-temperature thermo-analysis which is largely free of the mentioned shortcomings. The method is simple, reliable and permits the determination of solidus and liquidus temperatures of well crystallizing melts of highly fire-proof oxides in the temperature range of 1500° - 2400°C with an exactness of  $\pm 10^\circ$ . The method is suitable for material which does not react with molybdenum under purified helium, argon or nitrogen. Such substances are: BeO, MgO, CaO, SrO, Al<sub>2</sub>O<sub>3</sub>, La<sub>2</sub>O<sub>3</sub>, and oxides of the rare earths, SiO<sub>2</sub>, ZrO<sub>2</sub>, ThO<sub>2</sub>, UO<sub>2</sub>. The method cannot be recommended for systems containing oxides which are reduced at high temperatures or which, in molten stage, react with molybdenum, such as oxides of cobalt, iron, nickel, etc. The arrangement of the thermoelements in the furnace, the construction of the furnace, and the device for the mounting of the thermoelement are shown in Fig. 2. The upper part of the furnace was closed during the test with a special hood according to Budnikov, P.P., Tresvyatski, S.G., Kushakovski, V.I., (Ref. 5: Lecture #2193 at the 2nd International Conference of the UNO on Peaceful Application of Atomic Energy, Geneva, 1958) for the feeding and distribution of the shielding gas. The hood was not used at the beginning

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D029/D109

Methods of high-temperature ...

in accordance with Tresvyatski, S.G., Kushakovski, V.I., Belevantsev, V.S. (Ref 4: Ogneupory (1960) no. 4, p 180-181). Satisfying results without hood were, however, obtained only if the solidus and liquidus temperatures were at 2,000°C or below. An electronic compensation recorder EPP-09 with scale up to 10 mV was used for recording the heating and cooling curves. Such curves are usually recorded with a paper feeding speed of 6 mm/min. The tests were conducted with a cooling and heating velocity of 20 - 80 degr/min. It seems important to stress the following facts: On recording by an electronpotentiometer the thermoelement is grounded through the circuits of the apparatus. It is therefore necessary to isolate the furnace and secondary coils of the transformer against the ground potential. If this is omitted, parasite electromotive forces appear in the thermoelement circuit, produced by the thermo-ion and thermo-electron emission at high temperatures. This parasitic EMF distorts the results of the recorder. The switching-on and the breaking of the heating circuit must have no influence on the compensation recorder. The whole arrangement thermoelement - potentiometer was calibrated according to the melting points of pure fire-proof

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Methods of high-temperature ...

compounds. For this purpose the following values were established:  
 $MgAl_2O_4 = 2135 \pm 25^\circ C$ ;  $Al_2O_3 = 2050 \pm 10^\circ C$ ;  $3Al_2O_3 \cdot 2SiO_2 = 1900 \pm 10^\circ C$ ;  
 $Mg_2SiO_4 = 1860 \pm 20^\circ C$ ;  $CaAl_2O_4 = 1600 \pm 5^\circ C$ ;  $MgSiO_3 = 1563 \pm 2^\circ C$ ;  $CaF_2 = 1410 \pm 10^\circ C$ ;  
 $MgO \cdot CaO \cdot 2SiO_2 = 1591 \pm 3^\circ C$ . Chemically pure initial oxides were used for the production of binary and ternary compounds. The described method can be used successfully for the investigation of phase diagrams of metals, mixtures of metals and oxides, carbide, boride and similar systems. In such cases, however, the molybdenum plate must be coated with a metal oxide, a high-temperature enamel or a similar substance in order to avoid its melting and fusing with the substances tested. There are four figures and 5 Soviet-bloc references.

ASSOCIATION: Chemical-technological Institute ".D.I. Mendeleev", Moscow

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S/081/62/000/003/047/090  
B156/B101

AUTHORS: Budnikov, P. P., Tresvyatskiy, S. G.

TITLE: Procedure for high-temperature thermal analysis of oxide systems

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 3, 1962, 370-371,  
abstract 3K182 (Poroshk. metallurgiya, no. 1, 1961, 75-81)

TEXT: A procedure is described for the high-temperature thermal analysis of oxide systems. A tungsten-molybdenum thermocouple, with a small molybdenum plate welded to the junction to serve as a crucible for the substances being investigated, is recommended for determining the solidus and liquidus points between 1500 and 2400°C. The furnace used for heating to 2400°C has a heating tube made of electrographite, the tube is fitted with a special system of baffles to develop a circulating flow of inert gas (argon, helium, or pure nitrogen) which is fed into the furnace from above. This baffle arrangement prevents carbonization of the thermocouple and the contents of the crucible from the gaseous phase. The procedure

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Procedure for high-temperature ...

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provides good results when determining the solidus and liquidus points for systems in substances which do not react with molybdenum up to 2400°C.  
[Abstracter's note: Complete translation.]

Card 2/2



31610  
S/063/61/006/006/002/006  
A057/A126

15-2230

AUTHORS:

Tresvyatskiy, S. G., Doctor of Technical Sciences, Cherepanov, A. M.,  
Candidate of Technical Sciences.

TITLE:

Highly refractory systems with oxides of lanthanides and actinides

PERIODICAL:

Zhurnal vsesoyuznogo khimicheskogo obshchestva imeni D. I. Mendele-  
yeva, v. 6, no. 6, 1961, 612 - 618

TEXT:

A review of literature on oxides of lanthanides and actinides with other highly refractory oxides is presented and discussed. This discussion of phase diagrams is of practical and theoretical importance, since oxides of rare earth elements became valuable not only in atomic industry, but also in the manufacture of various highly refractory materials with special properties. Since the phase diagrams are still insufficiently developed, some of them are only tentative. International papers containing phase equilibrium diagrams of systems with  $UO_2$ ,  $ThO_2$ ,  $Sm_2O_3$ ,  $Gd_2O_3$ ,  $CeO_2-ZrO_2$ ,  $ZrO_2-La_2O_3$  and  $ZrO_2-Nd_2O_3$  are mentioned. Based on the presented review and discussions the following tentative general conclusions were drawn by the authors: Apparently all systems of four-valent actinide oxides with beryllium oxide are simple eutectic systems in the temperature range

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A057/A126

Highly refractory systems with...

of the solidus and liquidus. Formation of solid solutions, or at high temperature stable compounds could not be observed. Systems with magnesium oxide are probably also simple eutectic systems, but here the formation of solid solutions with a limited solubility at the side of the actinide oxide is possible. Systems with calcium oxide contain a liquidus of an eutectic type and a region of solid solutions at the side of actinide oxide. In these systems formation of melting (with decomposition) compounds is possible, but this question needs some further investigations. Systems with aluminum oxide are analogous to systems with beryllium oxide. Systems with zirconium dioxide are characterized by wide regions of solid solutions of two types, *ie*, based on actinide oxide and on zirconium oxide, with a two-phase region of these two solid solutions at intermediate concentrations. Characteristic for actinide oxide systems is the formation of solid solutions with an almost infinite solubility in the solid state. Systems with actinide oxides and  $\text{SiO}_2$  are characterized by an eutecticum close to  $\text{SiO}_2$  and by the formation of orthosilicates of the type  $\text{AcSiO}_4$ , melting with decomposition below the temperature of the liquidus. In systems of actinide oxides with oxides of trivalent rare earths a region of solid solutions is formed on the side of actinide oxide having a two-phase region of the solid solution and  $\text{Re}_2\text{O}_3$  (Re = rare earth) at the side of the rare earth oxide. In relation to systems with oxides of trivalent rare

X

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A057/A126

Highly refractory systems with...

earths, the following conclusions were presented: Systems with beryllium oxide are eutectic and analogous to systems with actinide oxides but they have a very low melting temperature of the liquidus (about 1,450 - 1,500°C). No investigations were made yet on systems with oxides of magnesium, calcium, and strontium. Characteristic for systems with aluminum oxide is the formation of compounds of the type  $\text{ReAlO}_3$ , melting without decomposition above 2,000°C, and the presence of two eutectica, one between  $\text{Re}_2\text{O}_3$ - $\text{ReAlO}_3$  and the other between  $\text{ReAlO}_3$ - $\text{Al}_2\text{O}_3$ . Apparently no solid solutions were formed between the components in these systems. Systems with zirconium dioxide are characterized by wide regions of solid solutions, and differ from other systems by complexity. They are not yet sufficiently investigated. Systems of rare earth oxides between themselves are not investigated, but the authors assume the possibility of the formation of regions of solid solutions, soluble in the solid state almost to infinity in these systems. Systems with  $\text{SiO}_2$  are characterized by the formation of three silicates, and the presence of a wide region of immiscibility in the liquid state at the side of  $\text{SiO}_2$ . The authors point out that the conclusions presented are only tentative because of the insufficiency in investigating the whole discussed matter. There are 17 figures, and 30 references: 11 Soviet-bloc and 19 non-Soviet-bloc. The references to the 4 most recent English-language publications read as follows: P. E. Evans, J. Am.

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Highly refractory systems with...

Ceram. Soc., 43, no. 9, 443 (1960); E. M. Levin, H. F. McMurdie, Phase Diagrams  
for Ceramists. Part. 2, USA, Ohio, 1959; C. Curtis, J. Johnson, J. Am. Ceram.  
Soc., 40, no. 1, 15 (1957); F. Alfred, A. White, Trans. Brit. Ceram. Soc., 58,  
no. 4, 199 (1959).

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S/080/61/034/003/001/017  
A057/A129

AUTHORS: Budnikov, P. P., Marakuyeva, N. A., Tresvyatskiy, S. G.  
TITLE: Effect of the composition of the binder on properties of mixes in  
hot-casting of ceramic products  
PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 3, 1961, 492-497

TEXT: The effect of the composition and amount of the binder on rheologic properties of alumina-containing ceramic mixes on paraffin-wax-stearin base binders with oleic acid admixtures was investigated. The quality of hot-cast ceramic products used in electro- and radio-ceramics and refractory materials depends on the cast mixes, which represent thermoplastic suspensions of a ceramic material in the binder. For the latter various thermoplastic organic materials with low melting point were used (paraffin, paraffin mixtures with wax or stearin, and oleic acid admixtures etc.). Studying the structural viscosity for rate gradients until  $80 - 100 \text{ sec}^{-1}$  and the casting ability of mixes furnished on fine-grade skeletons (mean grain diameter  $1.5 \mu$ ) and paraffin-wax-stearin binders with oleic acid admixture, abnormal viscosity, i.e., thixotropy in stearin and paraffin-stearin mixes and dilatation in wax and paraffin-wax mixes was observed. In

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Effect of the composition of the binder ...

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casting under pressure of 2-8 atm. mixes with a binder containing 85% paraffin, 12% stearin and 3% oleic acid had, due to thixotropy, a more than 1.5 times higher fluidity than the other mixes investigated. The last-mentioned composition of the binder is also recommended for casts with greater height (400 - 500 mm). The strength of casts containing 15% stearin in the binder is 20% lower in comparison to casts with a binder containing 15% wax. The present study on the important effect of composition of the binder on properties of mixes was made since few data are published in the literature related to this question, and no information at all is published on properties of fine-grade mixes (1 - 1.5  $\mu$ ). In some investigations, as published by P. O. Gribovskiy (Ref. 1: Goryacheye lit'ye keramicheskikh izdeliy [Hot casting of ceramic products], Gosenergoizdat, M. [1956]), viscosity was determined with an Engler viscosimeter and thus abnormal changes in viscosity of highly concentrated suspension effected by changes in pressure were not observed. As structure-forming agent in the present investigations "koraks" N = 320 ground with water for 6 hours in a vibration mill was used. The grain size of the powder was determined turbidimetrically and was found to be: 50 - 40  $\mu$  5%, 40 - 30  $\mu$  4%, 30 - 20  $\mu$  11%, 20 - 10  $\mu$  21%, 10 - 5  $\mu$  25%, below 5  $\mu$  34%. Specific surface of the powder was 1.05 m<sup>2</sup>/g, i.e., the mean grain diameter was about 1.5  $\mu$  determined by the method of diluted air

Card 2/7

Effect of the composition of the binder ...

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filtration described by B. V. Deryagin et al. (Ref. 5: Opredele niye vneshney udel'noy poverkhnosti poristyykh tel po metodu filtratsii razrezhennogo vozdukha (Determination of the external specific surface of porous materials by the method of filtration of diluted air), Izd. AN SSSR, M. (1958)). Homogenized paraffin was used as binder (melting point  $53^{\circ}\text{C}$ ), natural wax (softening point  $48-52^{\circ}\text{C}$ ), and stearin (melting point  $56^{\circ}\text{C}$ ). The latter was of the commercial grade and contained stearic, palmitic and oleic acid. Viscosity of the mixes was determined by a rotating viscosimeter (with inner rotating cylinder) of the Volarovich system (Ref. 6: Tr. Poligraph. inst. OGIZ [1937]), and the structural viscosity  $\eta$ , shear stress  $\tau$ , and rate gradient  $D$  were calculated from corresponding formulae. Fluidity for casting conditions under pressure (2-10 atm), i.e., for rate gradients thousand times higher than measurable on the Volarich viscosimeter, was estimated by measuring the filling depth of a spiral-shaped cavity (4 x 4 mm) with the mix at 2, 4, 6, 8, and 10 atm. The strength of the casts was determined by torsion tests on rod-shaped test samples. Fluidity curves (Fig. 1) of mixes with 29 vol% binder show an abnormal character. The paraffin-base mix is similar to a Bingham system and near to a Newton's liquid, while the wax-base mix shows dilatation, i. e., an increase in the rate gradient effects an increase in structural viscosity. The stearin-base mix shows thixotropy. The effect of shear

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Effect of the composition of the binder ...

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stress on structural viscosity of paraffin-, wax-, and stearin-base mixes is shown in Table 1. Curves on the effect of pressure on structural viscosity for mixes containing 8.5% of a two-component binder demonstrate a similar character of paraffin-wax-base and wax-base mixes, i.e., increase in structural viscosity with pressure. Paraffin-base mixes, on the other hand, are like stearin-base mixes showing thixotropy, i.e., decreased in structural viscosity with increasing pressure. This property is convenient for pressure casting. Curves on the effect of the composition of the binder on structural viscosity (Fig. 4) show for paraffin-wax base mixes a minimum at 25% wax content in the binder. Structural viscosity of paraffin-stearin-base mixes increases with the stearin content in the binder for a pressure range until 16,000 dyne/cm<sup>2</sup> (Fig. 4). Structural strength of casts decreases by adding stearin to paraffin-base binders. The optimum composition for pressure casting was found to be 85% paraffin and 15% stearin binders. The greatest strength is observed in casts based on paraffin-wax binders. Surface-active oleic acid decreases the structural strength, but has a positive effect on the fluidity of the mix. Optimum amount of oleic acid admixture is 3 weight % of the binder. Curves obtained for the casting ability of mixes under pressure (2-8 atm), estimated by the cavity-filling test, are linear and indicate that stearin-containing mixes have a much higher casting

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Effect of the composition of the binder ...

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ability than paraffin- or paraffin-wax-base mixes in spite of the higher viscosity of stearin-base mixes measured on the viscosimeter. Thus it can be stated that structural viscosity data are insufficient for the selection of optimum composition if obtained only at small rate gradients. Also Engler's viscosimeter is not convenient for estimations of the quality of cast mixes. There are 7 figures, 2 tables and 6 references: 4 Soviet-bloc and 2 non-Soviet-bloc.  
SUBMITTED: September 30, 1960

Table 1: Values for the structural viscosity of mixes at 80°C:

| Type of binder in the mix | viscosity (poise) at shear stress (in dyne/cm <sup>2</sup> ) |       |        |        |
|---------------------------|--|-------|--------|--------|
|                           | 2,000  | 6,000 | 10,000 | 12,000 |
| Paraffin                  | 75   | 60    | 60     | -      |
| Wax                       | 127  | 145   | 155    | 157    |
| Stearin                   | 3,000  | 1,080 | 520    | 320    |

Card 5/7

PEN'KOVSKIY, Vladimir Vladimirovich; SAMSONOV, G.V., otv. red.; TRESVYATSKIY, S.G., prof., doktor tekhn. nauk, otv. red.; POKROVSKAYA, Z.S., red.; YEFIMOVA, M.I., tekhn. red.

[Effect of radiation on metals and certain high-melting materials]  
Deistvie oblucheniia na metally i nekotorye tugoplavkie materialy.  
Kiev, Izd-vo Akad.nauk USSR, 1962. 182 p. (MIRA 15:7)

1. Chlen-korrespondent Akademii nauk USSR (for Samsonov).  
(Metals, Effect of radiation on)  
(Materials, Effect of radiation on)

TRESVIATSKIY, S.G.

"Some mathematical interrelationships observed in sintering high melting oxides."

Paper presented at the Powder Metallurgy Conference  
Smolenice, Czech. 17-20 Sep 1962

YEREMENKO, V.N., otv. red.; FRANTSEVICH, I.N., red.; SAMSONOV, G.V., red.; PISARENKO, G.S., red.; FEDORCHENKO, I.M., red.; TRESVIATSKIY, S.G., red.; IVASHCHENKO, Yu.N., red.; POKROVSKAYA, Z.S., red.; RAKHLINA, N.P., tekhn. red.

[Surface phenomena in melts and in processes of powder metallurgy] Poverkhnostnye iavleniia v rasplavakh i protsessakh poroshkovoï metallurgii. Kiev, Izd-vo AN Ukr. SSR, 1963. 377 p.

(MIRA 17:3)

1. Akademiya nauk URSR, Kiev. Instytut metalokeramiky i spetsial'nykh splaviv. 2. Institut metallokeramiki i spetsial'nykh splavov AN Ukr.SSR (for Yeremenko).

YEREMENKO, V.N., otv. red.; FRANTSEVICH, I.N., red.; SAMSONOV, G.V., red.; PISARENKO, G.S., red.; FEDORCHENKO, I.M., red.; TRESVIATSKIY, S.G., red.; IVASHCHENKO, Yu.N., red.; POKROVSKAYA, Z.S., red.

[Surface phenomena in melts and processes of powder metallurgy] Poverkhnostnye iavleniia v rasplavakh i protsessakh poroshkovoi metallurgii. Kiev, Izd-vo AN USSR, 1963. 456 p.

(MIRA 18:1)

1. Akademiya nauk URSS, Kiev. Institut metallokeramiki i spetsial'nykh splaviv. Institut metallokeramiki i spetsial'nykh splavov AN Ukr.SSR (for Ivashchenko, Yeremenko)

**"APPROVED FOR RELEASE: 03/20/2001**

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REPORT CONTINUED

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SUBMITTED: 3/10/64

ENCLOSURE

SUB CODE: MN

CONF 2: NO AEP SOV: 002

OTHER: 000

ENCLOSURE

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system

SOURCE: Voprosy i resheniya soveshchaniya po splavam redkikh metallov, 1963. Voprosy\* teorii i primeneniya redkozemel'nykh metallov (Problems in the theory and use of rare-earth metals)\* materials\* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 159-162

Rare earth metal

ABSTRACT: The paper describes the results of investigations of the  $\text{La}_2\text{O}_3\text{-Cr}_2\text{O}_3$  system in argon and in air. The temperature of melting and the liquidus line as a function of the composition, phase transformations, as well as the liquidus

Card 1/3

ASSOCIATION: None

SUBMITTED: 13 Jun 64

NO REF SOV: 000

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OTHER: 000



L 15201-65

ACCESSION NR: AT4048710

ENCLOSURE: 01

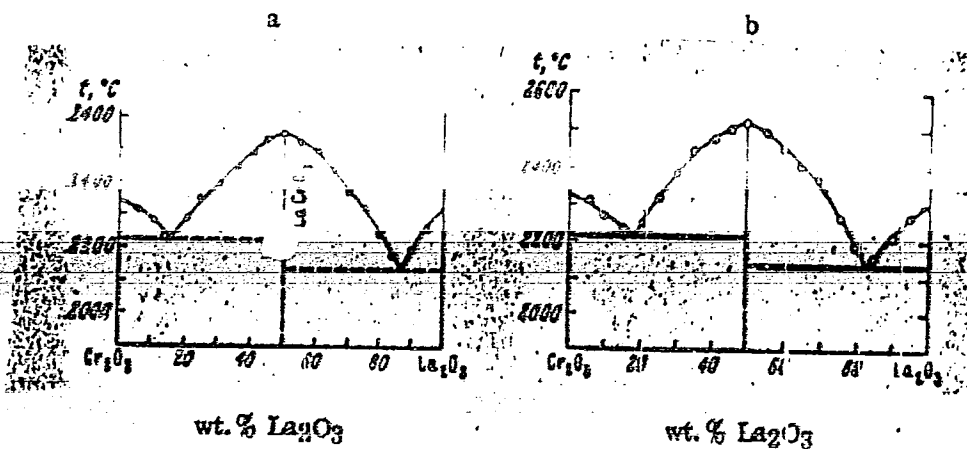


Figure 1. Phase diagram of the  $\text{La}_2\text{O}_3$ - $\text{Cr}_2\text{O}_3$  system:  
(a) in air, (b) in argon.

Card 3/3

YARMAK, O.F.; TRESVYATSKIY, S.G. [Tresviats'kiy, S.H.], doktor tekhn. nauk

Study of the mullitization process in the porcelain mass.

Leh. prom. no. 2:69-71. Apr-Je '64

(MIRA 17:7)

oxides of the basic subgroup of the periodic table has not been adequately studied. Other authors have established the dependence between the values of the ionic radii and the electronegativities

L 41237-65

ACCESSION NR. A404000

ALL INFORMATION CONTAINED HEREIN IS UNCLASSIFIED

PARKHOMENKO, M.A. [Parkhomenko, M.P.]; YAREMENKO, Z.A. [Iaremenko, Z.O.];  
TRESVIATSKIY, S.G. [Tresviats'kyi, S.H.]

New synthetic minerals of the mica group. Dop. AN URSR no.5:624-  
627 '64. (MIRA 17:6)

1. Institut metallokeramiki i spetsial'nykh splavov AN UkrSSR.  
Predstavleno akademikom AN UkrSSR I.N.Frantsevichem [Frantsevych,  
I.M.].

L 10855-06 EWT(m)/FNP(w)/EWP(v)/T/FWP(t)/EWP(k)/EWP(b)/EWA(c) IJF(c) JD/HM  
ACC NR: AP5028715 SOURCE CODE: UR/0363/65/001/011/1878/1882  
AUTHOR: <sup>44, 55</sup> Tresvyatskiy, S. G.; <sup>44, 55</sup> Yaremenko, Z. A.; <sup>44, 55</sup> Lopato, L. M.; <sup>44, 55</sup> Sokolovskiy, V. A.; Karpenko, V. Ya.  
ORG: <sup>44, 55</sup> Institute of Materials Science Problems, Academy of Sciences SSSR (Institut problem materialovedeniya Akademii nauk SSSR)  
TITLE: Some physicochemical properties of synthetic periclase single crystals  
SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 11, 1965, 1878-1882  
TOPIC TAGS: <sup>21, 44, 55</sup> magnesium oxide, single crystal, optic crystal  
ABSTRACT: The microhardness, microbirttleness, chemical stability, transmission spectrum, and working of synthetic magnesium oxide (periclase) single crystals were studied. The crystals are characterized by microhardness isotropy which amounts to 926-946 kg/mm. They are more stable to attack by acids and molten alkali metals than are polycrystals or sintered MgO. Single-crystals plates can be diffusion-welded at 1800-2000°C with a holding time of 30 to 60 min, and the welding seam obtained is optically transparent. Heat shock causes splitting of the single crystals along the cleavage plane. MgO single crystals are suitable materials for preparing optical windows, lenses, and prisms for the 0.3-7.0  $\mu$  spectral range not only at low but pro-

Card 1/2 UDC: 546.46:548.55

L 10826-66

ACC NR: AP5028715

bably also at high temperatures as well. This must be verified by further studies. Objects made of MgO can be polished by combining mechanical and chemical methods of treatment. Orig. art. has: 5 figures, 1 table.

SUB CODE: 11.07/  
20

SUBM DATE: 24Apr65/

ORIG REF: 002/

OTH REF: 000

HW  
Card 2/2

L 12057-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG

ACC NR: AP6001303

SOURCE CODE: UR/0363/65/001/008/1368/1371/48

AUTHOR: Lopato, L. M.; Yaremerko, Z. A.; Tresvyatskiy, S. G.

ORG: Institute of Materials Science Problems, Academy of Sciences UkrSSR (Institut problem materialovedeniya Akademii nauk UkrSSR)

TITLE: Study of the optical properties of compounds formed in the systems  $\text{Ln}_2\text{O}_3$ -SrO and  $\text{Ln}_2\text{O}_3$ -BaO

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 8, 1965, 1368-1371

TOPIC TAGS: crystal optic property, strontium compound, barium compound, samarium compound, europium compound, gadolinium compound, terbium compound, dysprosium compound, yttrium compound, erbium compound, thulium compound, scandium compound, lutetium compound

ABSTRACT: The optical properties of crystals of type  $\text{SrLn}_2\text{O}_4$  and  $\text{BaLn}_2\text{O}_4$ , where Ln = Sm, Eu, Gd, Tb, Dy, Y, Er, Tm, Lu, and Sc, were studied on powders by the immersion method and on polished sections. The refractive indices of  $\text{SrLn}_2\text{O}_4$  where Ln = Sm, Eu, Gd, Tb, Dy, Sc were within the range of values exhibited by the original oxides, whereas the refractive indices where Ln = Y, Ho, Er, Tm, Yb, Lu were higher by an average of 0.04. This indicates that the crystal lattices of these two sets of compounds differ in some respects,

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L 12057-66

ACC NR: AP6001303

even though the structural type is the same. The crystal-optical characteristics show that these compounds belong to the calcium ferrite type. On the basis of the data, the existence of a new type of substructures is postulated for compounds of this class. These substructures belong to the rhombic class of symmetry, but have a hexagonal-type unit cell. Orig. art. has: 1 figure and 3 tables.

SUB CODE: 07, 11/ SUBM DATE: 01Apr65 / ORIG REF: 002 / OTH REF: 007

Rare Earth elements

55, 07

Card 2/2

LOPATO, L.M.; YAREMENKO, Z.A.; TRESVIATSKIY, S.G. [Tresviats'kyi, S.H.]

Interaction of rare-earth oxides with strontium oxide.

Dop. AN URSSR no.11:1493-1497 '65.

(MIRA 18:12)

1. Institut problem materialovedeniya AN UkrSSR.

L 23805-66 EWT(m)/T/EWP(t) IJP(c) JD/JG

ACC NR: AP6007250

(A)

UR/0363/66/002/002/0269/0274

AUTHOR: Tresvyatskiy, S.G.; Pavlikov, V.N.; Lopato, L.M.

37

ORG: Institute for Problems of Materials, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

B

TITLE: Phase diagram of the system Sc<sub>2</sub>O<sub>3</sub>-Cr<sub>2</sub>O<sub>3</sub>

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v.2, no.2, 1966, 269-274

TOPIC TAGS: scandium compound, chromium compound, alloy phase diagram, metal heat treatment, x ray analysis

ABSTRACT: Phase transformations in the scandium trioxide-chromium trioxide system were studied in samples subjected to heat treatment in a high temperature furnace in an argon atmosphere. A photographic investigation was made by the conventional method with penetrating and reflected light; in the latter case with the use of etching in a melt of KHSO<sub>4</sub> at 200°C for 2 to 3 min. An X-ray investigation was made on URS-55a and URS-70 apparatus. Infrared spectra of the alloys were obtained on UR-10 spectroscope over an interval from 400-700 cm<sup>-1</sup>. The change in the oxide content during heat treatment was controlled by conventional chemical analysis. The article gives a phase diagram based on the experimental results, a table showing the X-ray results, and microphotos of the sam-

Card 1/2

UDC: 541.123.2

L 23805-66

ACC NR: AP6007250

ples. There was observed the existence of a compound which melts at  $2130 \pm 30^\circ\text{C}$ . The probable composition of this compound is:  $\text{Cr}_2\text{O}_3/\text{Sc}_2\text{O}_3 = 1:3$  or  $1:4$ . The initial oxides form solid solutions based on chromium oxide with a specific solubility of chromium oxide in scandium oxide is 10 mole %. With a decrease in temperature, the specific solubility decreases to 17 mole % scandium oxide and 5 mole % chromium oxide. Orig. art. has: 6 figures and 2 tables.

SUB CODE: 11/ SUBM DATE: 05Jul65/ ORIG REF: 005/ OTH REF: 008

Card 2/2. *W*

L 36402-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD

ACC NR: AP6018776

SOURCE CODE: UR/0070/66/011/003/0459/0463

AUTHOR: Tresvyatskiy, S. G.; Yaremenko, Z. A.; Lopato, L. M.

ORG: Institute for Problems in Materials (Institut problem materialovedeniya)

TITLE: Crystal optical properties of synthetic periclase single crystals

SOURCE: Kristallografiya, v. 11, no. 3, 1966, 459-463

TOPIC TAGS: crystal optic property, single crystal, x ray diffraction analysis, absorption spectrum

ABSTRACT: Large single crystals of periclase were grown by directional solidification and their crystal optical properties were studied. The directional cooling resulted in columnar crystals having the crystallographic growth axes  $g_4$ ,  $g_3$  and  $g_2$ . Cubic shaped crystals adopted  $g_4$  as the growth axis while  $g_3$  and  $g_2$  were typical of elongated crystals. The crystal dimensions along the growth axis were 50 mm and 20-30 mm along the cross section. Generally, the synthetic periclase crystals were transparent; only in some cases did they appear cloudy as a result of micropores (0.01 mm) or microcracks. Photographs and micrographs of the crystals are shown. Negative crystals (gaseous inclusions having crystalline forms) were observed and micrographs taken in the center of these showed a continuous mosaic structure. The crystals had a glassy shine and a Mohs hardness of 6. Chemical analysis revealed an impurity concentration of 0.01 to 0.5%;

UDC: 548.0 : 535/32

Card 1/2

L 36402-66

ACC NR: AP6018776

Al, Fe, Si and Cr were the residual impurities. Vacuum annealing to 2200°C further reduced the impurities. Refraction and birefracton were observed to occur in the crystals. X-ray measurements gave  $4.212 \pm 0.002 \text{ \AA}$  as the lattice parameter of the primitive cubic cell. Chemical and thermal etching was done in order to bring out the mosaic structure (0.1 to 0.01 mm) and the screw dislocations emerging at the surface. Further x-ray analysis showed the mosaic block dimensions to range from 0.01 to 1 mm, the angle of misorientation to be  $5^\circ$  and the dislocation density to be about  $10^5\text{--}10^6 \text{ cm}^{-2}$ . The absorption spectrum of the magnesium oxide crystals was measured for wavelengths ranging from 2 to 25  $\mu$ . From 2 to 6  $\mu$  the absorption was absent, from 6 to 10  $\mu$  it dropped sharply and from 10 to 25  $\mu$  it was very strong. Orig. art. has: 6 figures.

SUB CODE: 20,11/

SUEN DATE: 29Apr65/

ORIG REF: 002/

OTH REF: 002

Card 2/2 *MCP*

L 46242-66 EWT(m)/EWP(t)/ETI IJP(c) JD SOURCE CODE: UR/0363/66/002/007/1240/1243  
 ACC NR: AP6023917

AUTHOR: Shevchenko, A. V.; Lopato, L. M.; Tresvyatskiy, S. G. 24 β

ORG: Institute of Materials Science Problems, AN UkrSSR (Institut problem materialovedeniya AN UkrSSR)

TITLE: Phase diagram of the  $Gd_2O_3-Cr_2O_3$  system

SOURCE: AN SSSR. Izv. Neorg materialy, v. 2, no. 7, 1966, 1240-1243

TOPIC TAGS: gadolinium compound, phase diagram, chromium compound, chromium oxide

ABSTRACT: X-ray, microstructural, and chemical analyses as well as infrared spectroscopy were used to study the phase relationships in the  $Gd_2O_3-Cr_2O_3$  system in the 1600-2400°C range. The phase diagram obtained is shown in Fig. 1. It is shown that the system contains only one congruently melting chemical compound,  $GdCrO_3$ , which has a melting point of  $2350 \pm 30^\circ C$ . The compound forms eutectics; the eutectic with  $Gd_2O_3$  is composed of 77 mole %  $Gd_2O_3$  and 23 mole %  $Cr_2O_3$  and melts at  $2060 \pm 20^\circ C$ ; the eutectic with  $Cr_2O_3$  is composed of 15 mole %  $Gd_2O_3$  and 85 mole %  $Cr_2O_3$  and melts at  $2120 \pm 30^\circ C$ . Some physicochemical properties of gadolinium chromite (density, coefficient of linear thermal expansion, crystal optical properties) were determined. Orig. art. has: 3 figures.

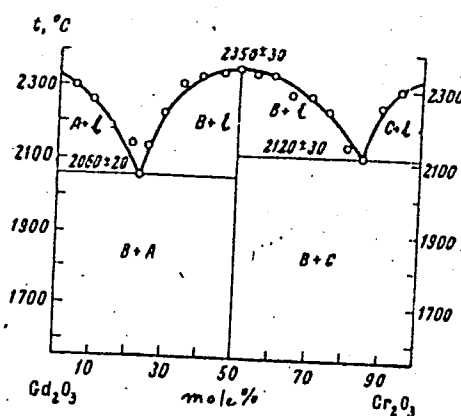
UDC: 546.662+546.763

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L 46242-66

ACC NR: AP6023917

Fig. 1. Phase diagram of the  $\text{Gd}_2\text{O}_3$ - $\text{Cr}_2\text{O}_3$  system.  $\text{Gd}_2\text{O}_3$  - A;  $\text{GdCrO}_3$  - B;  $\text{Cr}_2\text{O}_3$  - C



SUB CODE: 07/ SUBM DATE: 21Jun65/ ORIG REF: 004/ OTH REF: 002

Card 2/2 hs



L 46241-66 EWT(m)/EWP(t)/ETI LJP(c) JD  
ACC NR: AP6023918 SOURCE CODE: UR/0363/66/002/007/1244/1247

AUTHOR: Pavlikov, V. N.; Lopato, L. M.; Tresvyatskiy, S. G.

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TITLE: Study of the phase diagram of the  $Y_2O_3$ - $Cr_2O_3$  system

SOURCE: AN SSSR. Izv. Neorg materialy, v. 2, no. 7, 1966, 1244-1247

TOPIC TAGS: phase diagram, yttrium compound, chromium oxide

ABSTRACT: The phase diagram of the  $Y_2O_3$ - $Cr_2O_3$  system was studied in the 1800-2500°C range, apparently for the first time. The diagram (see Fig. 1) was plotted on the basis of petrographic and x-ray structural studies of samples subjected to heat treatment in argon. It was found that the system contains only one compound of composition 1:1, melting congruently at 2310±30°C. The compound undergoes a partial thermal dissociation in the solid phase, which causes the maximum on the fusibility curve to be diffuse. The compound forms two eutectics: one with  $Y_2O_3$ , composed of 72 mole %  $Y_2O_3$  and 28 mole %  $Cr_2O_3$  and melting at 2020±30°C, and one with  $Cr_2O_3$ , composed of 80 mole %  $Cr_2O_3$  and 20 mole %  $Y_2O_3$ , melting at 2070±30°C. No solid solutions were observed in the system. Orig. art. has: 3 figures and 1 table.

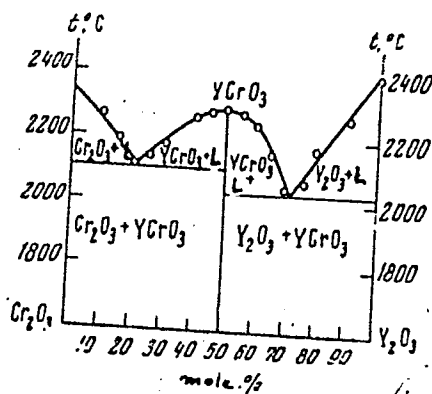
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UDC: 546.641-31+546.763-31

L 46241-66

ACC NR: AP6023918

Fig. 1. Phase diagram of the  $Y_2O_3$ - $Cr_2O_3$  system



SUB CODE: 07/ SUBM DATE: 11Oct65/ ORIG REF: 001/ OTH REF: 005

hs

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L 46125-66 EWT(m)/EWP(t)/ETI IJP(c) JD/JG  
ACC NR: AP6028203 SOURCE CODE: UR/0078/66/011/006/1442/1445

AUTHOR: Pavlikov, V. N.; Tresvyatskiy, S. G.

ORG: none

TITLE: The  $\text{Nd}_2\text{O}_3\text{-Cr}_2\text{O}_3$  system

SOURCE: Zhurnal neorganicheskoy khimii. v. 11, no. 6, 1966, 1442-1445

TOPIC TAGS: phase diagram, phase composition, niobium compound, chromium oxide

ABSTRACT: The phase diagram of the  $\text{Nd}_2\text{O}_3\text{-Cr}_2\text{O}_3$  system was studied in argon atmosphere in the 1800-2500°C range. Samples varying in composition by 2-5 mol % were prepared by threefold fusing of powdered mixtures of  $\text{Nd}_2\text{O}_3$  and  $\text{Cr}_2\text{O}_3$  for 2 hrs at 1200°C. The structures of various samples were examined on the URS-55 x-ray machine and the temperatures were measured with an optical pyrometer OPPIR-O 17.0. It was found that only one compound, niobium chromite-- $\text{NbCrO}_3$ , exists in the  $\text{Nd}_2\text{O}_3\text{-Cr}_2\text{O}_3$  system in the 1800-2500°C range. The  $\text{NbCrO}_3$  has a melting point of 2330° and a density of  $8.08 \pm 0.02$  g/cm<sup>3</sup>. Niobium chromite was found to form one eutetic with  $\text{Nd}_2\text{O}_3$  which is composed of 76 mol %  $\text{Nd}_2\text{O}_3$  and 24 mol %  $\text{Cr}_2\text{O}_3$  with a melting point of  $2060 \pm 30^\circ\text{C}$ , and one eutetic with  $\text{Cr}_2\text{O}_3$ , which is composed of 78 mol %  $\text{Cr}_2\text{O}_3$ , and 22 mol %  $\text{Nb}_2\text{O}_3$  with a melting point of  $2100 \pm 30^\circ\text{C}$ . It was found that there are no phases in the  $\text{Nb}_2\text{O}_3\text{-Cr}_2\text{O}_3$  system which contain divalent chromium. Orig. art. has: 2 figures, 1 table.

SUB CODE: 11,07 SUBM DATE: 20Nov64/ ORIG REF: 002/ OTH REF: 007

Card 1/1 JS

UDC: 546.657-31+546.763-31+541.123.2

L 02993-67 EWP(e)/EWT(m)/EWP(j)/T IJP(c) WW/RM/WH  
 ACC NR: AP6032957 SOURCE CODE: UR/0363/66/002/010/1897/1899, 64  
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 ORG: Institute of Problems of the Science of Materials, Academy of Sciences A UkrSSR  
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 TITLE: Some properties of foamed quartz glass 15  
 SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 10, 1966, 1897-1899  
 TOPIC TAGS: quartz, quartz glass, foamed ~~quartz~~ glass, ~~foamed quartz glass properties~~  
~~thermal insulation, high temperature insulation~~ heat insulation, ~~heat~~ insulat-  
 ing material, GLASS INSULATION, GLASS PROPERTY, POROSITY, HEAT  
RESISTANT, GLASS  
 ABSTRACT: Some of the physical properties of foamed quartz glass have been studied to determine its prospective use as a heat insulating material at high temperatures. The material obtained had a density of 0.3—0.35 g/cm<sup>3</sup> and an actual porosity of 80—85%, 20 to 30% of which were closed pores. Large pores with a diameter of .5 to 2 mm were seen; small closed pores with a 0.1 mm diameter were situated in the wall of larger pores. The foamed quartz glass contained no crystalline phases. Its refractive index was 1.455 ± 0.001. Compressive strength, determined on cubes of 10 x 10 x 10 to 20 x 20 x 20 mm, was the range 40—70 kg/cm<sup>2</sup> at 20C. Thermal conductivity was in the range 0.1160 to 0.250 kcal/m·hr·centigrade.. The heat resistance  
 UDC: 666.19+666.189.3  
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